

**Amendments to the Claims:**

This listing of the claim will replace all prior versions, and listings, of the claim in the application:

**Listing of Claims:**

What is claimed is:

1. (previously amended) A spectrometer, comprising:
  - a source of a primary beam of radiant energy;
  - a beamsplitter fixed in relation to the primary beam, for dividing primary beam into at least first and second energy beams which follow first and second optical paths;
  - a tunable solid-state reference laser coupled to the spectrometer through a filter;
  - at least one return reflector for reflecting the first beam back to the beamsplitter;
  - at least one radiant energy detector; and
  - a control, data acquisition and processing electronic system.
2. (withdrawn pursuant to a restriction requirement)

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3. (withdrawn pursuant to a restriction requirement)
4. (previously amended) The spectrometer of claim 1 where the filter is an etalon.
5. (previously amended) The spectrometer of claim 1 where the solid-state laser is a vertical cavity surface emitting laser.
6. (previously amended) The spectrometer of claim 1 where the solid state laser has a linewidth of less than one wavenumber.
7. (withdrawn pursuant to a restriction requirement)
8. (withdrawn pursuant to a restriction requirement)
9. (withdrawn pursuant to a restriction requirement)
10. (withdrawn pursuant to a restriction requirement)

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11. (previously amended) The spectrometer of claim 1 where the signal generated by the solid-state reference laser is demodulated.
12. (previously amended) The spectrometer of claim 1 wherein the detector further comprises a transfer function and wherein an additional source of radiant energy is used to probe the transfer functions of the detector.
13. (previously amended) The spectrometer of claim 1 wherein the detector further comprises a transfer function and the transfer function of the detector is inverted by the use of an adaptive filter.
14. (previously amended) The spectrometer of claim 1 where the radiation detector detects an optically subtracted beam.
15. (previously amended) The spectrometer of claim 1 further comprising an additional source of radiant energy acting as

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a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data acquisition and processing electronic system to correct for nonlinear response using the response to the probe signal.

16. (withdrawn pursuant to a restriction requirement)

17. (withdrawn pursuant to a restriction requirement)